

## Climate Change is a National Security Threat: An Overwhelming Consensus

### Summary

**National security experts and scientists overwhelmingly agree: climate change poses a grave threat to our national security.** The consensus is broad, deep, long-standing, and a necessary [input](#) into our national security decision-making. And it is regularly reflected in high-level assessments by our military and its [leadership](#), the intelligence community, other federal agencies, international organizations and the scientific community.

**But despite the writing on the wall, Trump continues to deny climate change.** His latest gambit – a National Security Council committee led by a notorious climate denier to “review” this factual consensus – is an attempt to willfully mislead the American people to the benefit of special interests. This committee is the next phase of Trump’s all-out assault on the facts underlying climate change – and follows in the footsteps of his threatened withdrawal from the Paris Climate Agreement, censoring and suppressing climate research and policy language, and rolling back [dozens](#) of environmental regulations, among others.

**Trump’s reckless decision to lead an assault on this factual consensus is a grave national security threat. That is why elected leaders, security experts, the scientific community and American citizens must continue to confront Trump with the facts:**

***“The effects of a changing climate are a national security issue with potential impacts to Department of Defense missions, operational plans, and installations.”*** – Report on Effects of a Changing Climate to the Department of Defense (2019)

***“Continued warming...is expected to cause substantial net damage to the U.S. economy...annual losses in some economic sectors are projected to reach hundreds of billions of dollars by the end of the century”*** – Fourth National Climate Assessment (2018)

***“[The] evidence of human-caused climate change is overwhelming and continues to strengthen, that the impacts of climate change are intensifying across the country, and that climate-related threats to Americans’ physical, social, and economic well-being are rising.”*** – Fourth National Climate Assessment (2018)

***“The consensus that humans are causing recent global warming is shared by 90%–100% of publishing climate scientists according to six independent studies by co-authors of this paper. The results of this synthesis are consistent with the 97 percent consensus reported by Cook et al in 2013, and the synthesis concludes that the 97 percent consensus is robust and consistent with other surveys of climate scientists and peer-reviewed studies.”*** – “Consensus on consensus: a synthesis of consensus estimates on human-caused global warming,” Environmental Research Letters (2016)

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***“Climate change is projected to produce more intense and frequent extreme weather events, multiple weather disturbances, along with broader climatological effects, such as sea level rise...These effects are likely to pose significant national security challenges for the United States over the next two decades.”*** – Memorandum on Implications for US National Security of Anticipated Climate Change (2016)

***“Climate change will affect the Department of Defense’s ability to defend the Nation and poses immediate risks to U.S. national security.”*** – Department of Defense Climate Change Adaptation Roadmap (October 2014)

***“Climate change is a global problem. Its impacts do not respect national borders. No nation can deal with it alone. We must work together, building joint capabilities to deal with these emerging threats.”*** – Department of Defense Climate Change Adaptation Roadmap (October 2014)

***“Politics or ideology must not get in the way of sound planning. Our armed forces must prepare for a future with a wide spectrum of possible threats, weighing risks and probabilities to ensure that we will continue to keep our country secure.”*** – Department of Defense Climate Change Adaptation Roadmap (October 2014)

***“Assessments conducted by the intelligence community indicate that climate change could have significant geopolitical impacts around the world, contributing to poverty, environmental degradation, and the further weakening of fragile governments. Climate change will contribute to food and water scarcity, will increase the spread of disease, and may spur or exacerbate mass migration.”*** – Quadrennial Defense Review (2010)

***“Observations show that warming of the climate is unequivocal. The global warming observed over the past 50 years is due primarily to human-induced emissions of heat-trapping gases. These emissions come mainly from the burning of fossil fuels (coal, oil, and gas), with important contributions from the clearing of forests, agricultural practices, and other activities.”*** – Second National Climate Assessment (2009)

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### Appendix 1: Landmark Assessments

**[Report on Effects of a Changing Climate to the Department of Defense \(2019\)](#)**: authored by the Department of Defense to identify significant vulnerabilities over the next 20 years to military installations and combatant commander requirements/operations resulting from climate change.

- **Key findings:**
  - Climate change is a national security issue that will impact our national defense.
  - Of the 79 mission assurance priority installations assessed, two-thirds may be flooded, more than half may experience drought, and more than half are threatened by wildfires, and all of these threats could erode military readiness.
  - Mission execution and frequency would be impacted by the timing and severity of climate-related events and their effect on country instability.
- **Key Quotes:**
  - “The effects of a changing climate are a national security issue with potential impacts to Department of Defense missions, operational plans, and installations.”

**[DNI Worldwide Threat Assessment \(2019\)](#)**: authored by the Intelligence Community and compiled by the Office of the Director of National Intelligence. This report describes climate change as a “worldwide threat” to U.S. national security interests.

- **Key findings:**
  - Climate change will likely “fuel competition for resources, economic distress, and social discontent through 2019 and beyond” and exacerbate global health risks.
- **Key quotes:**
  - “Changes in the frequency and variability of heat waves, droughts, and floods—combined with poor governance practices—are increasing water and food insecurity around the world, increasing the risk of social unrest, migration, and interstate tension in countries such as Egypt, Ethiopia, Iraq, and Jordan.”
  - “Extreme weather events, many worsened by accelerating sea level rise, will particularly affect urban coastal areas in South Asia, Southeast Asia, and the Western Hemisphere. Damage to communication, energy, and transportation infrastructure could affect low-lying military bases, inflict economic costs, and cause human displacement and loss of life.”

**[The Fourth National Climate Assessment \(2018\)](#)**: authored by thirteen federal agencies, including the Department of Defense, and performs a wide survey of available climate science and the government’s own data to analyze climate change’s effects in the United States.

- **Key Findings:**
  - We are experiencing the warmest period in the history of civilization, and no explanation exists besides human activity. This has caused record breaking increases in extreme weather events and sea level rise, and risks causing irreversible damage to the planet unseen in tens of millions of years.

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- Climate change could cost the United States hundreds of billions of dollars by the end of the century and threatens our communities, food and water supply, public health, agricultural production and livelihoods, our coasts, and tourism.
- **Key Quotes:**
  - “[the] evidence of human-caused climate change is overwhelming and continues to strengthen, that the impacts of climate change are intensifying across the country, and that climate-related threats to Americans’ physical, social, and economic well-being are rising.”
  - “Continued warming...is expected to cause substantial net damage to the U.S. economy...annual losses in some economic sectors are projected to reach hundreds of billions of dollars by the end of the century”
  - “Rising temperatures, extreme heat, drought, wildfire on rangelands, and heavy downpours are expected to increasingly disrupt agricultural productivity.”

**IPCC - Global Warming of 1.5 °C (2018)** - authored by the Intergovernmental Panel on Climate Change, the UN's official expert body for assessing climate change science.

- **Key findings:**
  - World governments would need to sharply reduce carbon dioxide emissions by 2030 to hold temperatures below 1.5 degrees Celsius, above which scientists say the most damaging effects of climate change will begin to phase in.
  - By 2050, the world would need to have a near-total phaseout of coal burning, devote large swaths of land to growing trees, and invest in carbon capture programs to avoid the worst effects of climate change.
- **Key quotes:**
  - “Estimates of the global emissions outcome of current nationally stated mitigation ambitions as submitted under the Paris Agreement...would not limit global warming to 1.5°C, even if supplemented by very challenging increases in the scale and ambition of emissions reductions after 2030 (high confidence).”
  - “Global warming is *likely* to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate (high confidence).”

**Memorandum on Implications for US National Security of Anticipated Climate Change (2016)**: authored by the National Intelligence Council to assess the implications of climate change on U.S. national security.

- **Key findings:**
  - Over the next 5 years, climate change will pose a security risk largely through extreme weather events and exacerbating “currently strained conditions.”
  - Over the next 20 years, climate change is likely to have “broader, systemic changes” that will increase social and political tensions and have negative impacts on human and economic security.
- **Key quotes:**
  - “Climate change is projected to produce more intense and frequent extreme weather events, multiple weather disturbances, along with broader climatological

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effects, such as sea level rise. These are almost certain to have significant direct and indirect social, economic, political, and security implications during the next 20 years. These effects will be especially pronounced as populations continue to concentrate in climate-vulnerable locales such as coastal areas, water stressed regions, and ever-growing cities. These effects are likely to pose significant national security challenges for the United States over the next two decades, though models forecast the most dramatic effects further into the future.”

**Department of Defense Climate Change Adaptation Roadmap (October 2014)**: The roadmap assesses the vulnerability of the military’s 7,000 bases to climate change, starkly warning that “climate change will affect the Department of Defense’s ability to defend the Nation and poses immediate risks to U.S. national security.”

- **Key findings:**
  - Climate change will affect the Pentagon’s full range of activities, including “plans, operations, training, infrastructure, and acquisition.”
  - Rising global temperatures, changing precipitation patterns, extreme weather events, and rising sea levels will have the most significant impact on the DoD.
  - Climate change will likely interact with other existing “stressors — poverty, environmental degradation, political instability and social tensions — to accelerate conflict and instability detrimental to U.S. interests.”
- **Key quotes:**
  - “Climate change will affect the Department of Defense’s ability to defend the Nation and poses immediate risks to U.S. national security.”
  - “Climate change is a global problem. Its impacts do not respect national borders. No nation can deal with it alone. We must work together, building joint capabilities to deal with these emerging threats.”
  - “Politics or ideology must not get in the way of sound planning. Our armed forces must prepare for a future with a wide spectrum of possible threats, weighing risks and probabilities to ensure that we will continue to keep our country secure.”

## **Appendix II: Additional Assessments**

**U.S. Government-Wide Reports**

**Department of Defense Reports**

**Intelligence Community Reports**

**Department of Homeland Security Reports**

**UN Reports**

**Scientific Reports**

**U.S. Government-Wide Reports**

**NCA3: National Climate Assessment 3 (2014)**

- **Key quotes:**

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- Climate change, “once considered an issue for a distant future, has moved firmly into the present.”
- NCA3 concludes that “the evidence of human-induced climate change continues to strengthen and that impacts are increasing across the country.”
- Noting that climate science has strengthened, the report states that there is “increased certainty” that the world is now seeing impacts associated with human-induced climate change,” and “many lines of independent evidence demonstrate that the rapid warming of the past half-century is due primarily to human activities.”

### **NCA2: National Climate Assessment 2 (2009) - Global Climate Change Impacts in the United States**

- **Key quotes:**
  - “Observations show that warming of the climate is unequivocal. The global warming observed over the past 50 years is due primarily to human-induced emissions of heat-trapping gases. These emissions come mainly from the burning of fossil fuels (coal, oil, and gas), with important contributions from the clearing of forests, agricultural practices, and other activities.”
  - “Likely future changes for the United States and surrounding coastal waters include more intense hurricanes with related increases in wind, rain, and storm surges (but not necessarily an increase in the number of these storms that make landfall), as well as drier conditions in the Southwest and Caribbean. These changes will affect human health, water supply, agriculture, coastal areas, and many other aspects of society and the natural environment.”

### **Department of Defense Reports**

#### **Directive 4715.21: Climate Change Adaptation and Resilience (Jan 2016)**

- **Key quotes:**
  - “The DoD must be able to adapt current and future operations to address the impacts of climate change in order to maintain an effective and efficient U.S. military Mission planning and execution must include: a. Identification and assessment of the effects of climate change on the DoD mission. b. Taking those effects into consideration when developing plans and implementing procedures. c. Anticipating and managing any risks that develop as a result of climate change to build resilience.”

#### **2014 QDR: Quadrennial Defense Review (October 2014)**

- **Key quotes:**
  - “The pressures caused by climate change will influence resource competition while placing additional burdens on economies, societies, and governance institutions around the world. These effects are threat multipliers that will aggravate stressors abroad such as poverty, environmental degradation, political

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instability, and social tensions – conditions that can enable terrorist activity and other forms of violence.”

- “As greenhouse gas emissions increase, sea levels are rising, average global temperatures are increasing, and severe weather patterns are accelerating. These changes, coupled with other global dynamics, including growing, urbanizing, more affluent populations, and substantial economic growth in India, China, Brazil, and other nations, will devastate homes, land, and infrastructure. Climate change may exacerbate water scarcity and lead to sharp increases in food costs.”
- “We have increased our preparedness for the consequences of environmental damage and continue to seek to mitigate these risks while taking advantage of opportunities. The Department’s operational readiness hinges on unimpeded access to land, air, and sea training and test space. Consequently, we will complete a comprehensive assessment of all installations to assess the potential impacts of climate change on our missions and operational resiliency, and develop and implement plans to adapt as required.”

### **Department of Defense FY 2012 Climate Change Adaptation Roadmap (2012)**

- **Key quotes:**
  - “Climate-related effects already are being observed at DoD installations throughout the U.S. and overseas. The physical changes are projected to include rising temperature and sea level and increases in both heavy downpours and the extent of drought. These will cause effects such as more rapid coastal erosion, shifts in growing seasons, and changing water tables.”
  - “As climate science advances, the Department will need to regularly reevaluate climate-related risks and opportunities in order to develop policies and plans that manage climate change’s impacts on the Department’s operating environment, missions, and facilities. Managing the national security implications of climate change will require DoD to work collaboratively, with both traditional allies and new partners.”

### **Navy Climate Change Roadmap (April 2010)**

- **Key quotes:**
  - “A preponderance of global observational evidence shows the Arctic Ocean is losing sea ice, global temperatures are warming, sea level is rising, large landfast ice sheets (Greenland and Antarctic) are losing ice mass, and precipitation patterns are changing. While there has been criticism on the details of the methods and results found in reports published by the IPCC and other entities, the Navy acknowledges that climate change is a national security challenge with strategic implications for the Navy.”

### **2010 QDR - Quadrennial Defense Review (2010)**

- **Key quotes:**

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- “Climate change will affect DoD in two broad ways. First, climate change will shape the operating environment, roles, and missions that we undertake. The U.S. Global Change Research Program, composed of 13 federal agencies, reported in 2009 that climate-related changes are already being observed in every region of the world, including the United States and its coastal waters. Among these physical changes are increases in heavy downpours, rising temperature and sea level, rapidly retreating glaciers, thawing permafrost, lengthening growing seasons, lengthening ice-free seasons in the oceans and on lakes and rivers, earlier snowmelt, and alterations in river flows.”
- “Assessments conducted by the intelligence community indicate that climate change could have significant geopolitical impacts around the world, contributing to poverty, environmental degradation, and the further weakening of fragile governments. Climate change will contribute to food and water scarcity, will increase the spread of disease, and may spur or exacerbate mass migration.”
- “While climate change alone does not cause conflict, it may act as an accelerant of instability or conflict, placing a burden to respond on civilian institutions and militaries around the world. In addition, extreme weather events may lead to increased demands for defense support to civil authorities for humanitarian assistance or disaster response both within the United States and overseas.”
- “In 2008, the National Intelligence Council judged that more than 30 U.S. military installations were already facing elevated levels of risk from rising sea levels. DoD’s operational readiness hinges on continued access to land, air, and sea training and test space. Consequently, the Department must complete a comprehensive assessment of all installations to assess the potential impacts of climate change on its missions and adapt as required.”

### **Intelligence Community Reports**

#### **DNI Worldwide Threat Assessment (2018)**

- **Key quotes:**
  - “The impacts of the long-term trends toward a warming climate, more air pollution, biodiversity loss, and water scarcity are likely to fuel economic and social discontent—and possibly upheaval—through 2018.”
  - “Accelerating biodiversity and species loss—driven by pollution, warming, unsustainable fishing, and acidifying oceans—will jeopardize vital ecosystems that support critical human systems. Recent estimates suggest that the current extinction rate is 100 to 1,000 times the natural extinction rate.”

#### **DNI Worldwide Threat Assessment (2017)**

- **Key quotes:**
  - “This warming is projected to fuel more intense and frequent extreme weather events that will be distributed unequally in time and geography. Countries with

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- large populations in coastal areas are particularly vulnerable to tropical weather events and storm surges, especially in Asia and Africa”
- “As greenhouse gas emissions increase, sea levels are rising, average global temperatures are increasing, and severe weather patterns are accelerating. These changes, coupled with other global dynamics, including growing, urbanizing, more affluent populations, and substantial economic growth in India, China, Brazil, and other nations, will devastate homes, land, and infrastructure.”

### **DNI Worldwide Threat Assessment (2016)**

- **Key quotes:**
  - “Extreme weather, climate change, environmental degradation, related rising demand for food and water, poor policy responses, and inadequate critical infrastructure will probably exacerbate—and potentially spark—political instability, adverse health conditions, and humanitarian crises in 2016.”
  - “The Paris climate change agreement establishes a political expectation for the first time that all countries will address climate change. The response to the deal has been largely positive among government officials and nongovernmental groups, probably because the agreement acknowledges the need for universal action to combat climate change along with the development needs of lower income countries.”

### **DNI Worldwide Threat Assessment (2015)**

- **Key quotes:**
  - “Extreme weather, climate change, and public policies that affect food and water supplies will probably create or exacerbate humanitarian crises and instability risks. Globally averaged surface temperature rose approximately 0.8 degrees Celsius (about 1.4 degrees Fahrenheit) from 1951 to 2014; 2014 was warmest on earth since record-keeping began. This rise in temperature has probably caused an increase in the intensity and frequency of both heavy precipitation and prolonged heat waves and has changed the spread of certain diseases. This trend will probably continue. Demographic and development trends that concentrate people in cities—often along coasts—will compound and amplify the impact of extreme weather and climate change on populations.”
  - “Infectious diseases are among the foremost health security threats. A more crowded and interconnected world is increasing the opportunities for human and animal diseases to emerge and spread globally. This has been demonstrated by the emergence of Ebola in West Africa on an unprecedented scale...Climate change can also lead to changes in the distribution of vectors for diseases.”

### **DNI Worldwide Threat Assessment (2014)**

- **Key quotes:**
  - “Empirical evidence alone—without reference to climate models—suggests that a general warming trend is probably affecting weather and ecosystems,

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exacerbating the impact on humans. This warmer atmosphere, wetter in some areas, drier in others, is consistent with increasing atmospheric concentrations of greenhouse gases. In recent years, local food, water, energy, health, and economic security have been episodically degraded worldwide by severe weather conditions. These include more frequent or intense floods, droughts, wildfires, tornadoes, cyclones, coastal high water, and heat waves.”

- “Intense storms—including typhoons, hurricanes, tornadoes, cyclones, and derechos—when exposed to growing human infrastructure, contribute to greater damage and threaten ever-increasing urban populations and economic development. This trend will likely continue to place stress on first responders, non-government organizations, and militaries that are often called to provide humanitarian assistance.”

### **National Intelligence Council: [Global Trends - Paradox of Progress \(2017\)](#)**

- **Key quotes**

- “Natural and human-induced changes in many of Earth’s ecosystems during the coming decades are likely to weaken the planet’s resilience and expose humans to new health, food, water, energy, and infrastructure vulnerabilities and demands.”
- “Over the longer term, global climatological stresses will change how and where people live, as well as the diseases they face. Such stresses include sea-level rise, ocean acidification, permafrost and glacial melt, air quality degradation, changes in cloud cover, and sustained shifts in temperature and precipitation.”
- “Environmental and climate changes will challenge systems in different dimensions; heat waves, for example, stress infrastructure, energy, human and animal health, and agriculture. Climate change—observed or anticipated—almost certainly will become an increasingly integral component of how people view their world, especially as populations are projected to swell in those areas most vulnerable to extreme weather events and sea-level rise, including coastal megacities and regions already suffering from water scarcity.”
- “Changing environmental conditions and increasing global connectivity will affect precipitation patterns, biodiversity, and the geographic distribution of pathogens and their hosts, which will in turn affect the viability and vitality of crops and agricultural systems; the emergence, transmission, and spread of human and animal infectious diseases; and potential medical and pharmacological discoveries. The direct impact by environmental stressors to human health from increased heat stress, floods, drought, and increased frequency of intense storms will force difficult decisions on how and where to live, particularly in low-income countries in sub-Saharan Africa and South Asia.”

### **National Intelligence Council: [Memorandum on Implications for US National Security of Anticipated Climate Change \(2016\)](#)**

- **Key quotes:**

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- “Rising sea levels, flooding, droughts, higher temperatures, and more frequent extreme weather events will increasingly threaten military capabilities and facilities on both US and foreign territory, including military bases and training ranges.”
- “The financial burden of responding to emergent climate trends and severe weather events, including the cost of efforts to mitigate greenhouse gas emissions, will reduce financing available for other investments, except in cases where those climate investments lead to green-growth opportunities. Increasing heat stress is likely to adversely affect agriculture, manufacturing, and other sectors requiring physical labor and could significantly contribute to GDP loss.”
- “Many countries will encounter climate-induced disruptions—such as weather-related disasters, drought, famine, or damage to infrastructure—that stress their capacity to respond, cope with, or adapt. Climate-related impacts will also contribute to increased migration... When climate-related effects overwhelm a state’s capacity to respond or recover, its authority can be so undermined as to lead to large-scale political instability.”
- “Decreases in water and disputes over access to arable land will increase the risk of conflict between people who share river basins, aquifers, or land areas... Although environmental stress is rarely the sole cause, disputes between groups within countries over land and water resources are increasingly common as triggers for social violence and internal conflict, particularly when social and political tensions already exist.”
- “Sudden extreme weather—such as from floods, droughts, and severe tropical storms—almost certainly will increase the number of displaced people... Over 20 years, the net effects of climate change on the patterns of global human movement and statelessness could be dramatic, perhaps unprecedented. If unanticipated, they could overwhelm government infrastructure and resources, and threaten the social fabric of communities.”
- “The resulting retreat of sea ice is creating new possibilities for resource extraction, tourism, fishing, and shipping routes between the Atlantic and Pacific. Unpredictable ice floes, remoteness, and harsh conditions will limit operations in the Arctic over the coming decade, but disputes over unresolved maritime boundary claims, military posturing, and economic activity could increase as the Arctic opens.”

### **Department of Homeland Security Reports**

#### **Quadrennial Homeland Security Review (2014)**

- **Key quotes:**
  - “They aggravate stressors abroad that can enable terrorist activity and violence, such as poverty, environmental degradation, and social tensions. More severe droughts and tropical storms, especially in Mexico, Central America, and the

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Caribbean, could also increase population movements, both legal and illegal, across the U.S. border.”

- “The United States may need to prepare for more frequent, short-term, disaster-driven migration. Higher temperatures and more intense storms may also damage or disrupt telecommunications and power systems, creating challenges for telecommunications infrastructure, emergency communications, and the availability of cyber systems. Finally, the cost of preparing for, responding to, and recovering from such events is anticipated to grow as weather-related events continue to become more severe and damaging.”

### **UN Reports**

#### **UNEP Emissions Gap Report (2018)**

- **Key quotes:**
  - “The year 2018 will most likely be the fourth warmest year on record since 1880, with the past five years the five warmest ever recorded (NOAA, 2018). In addition to increased temperatures, 2018 has experienced numerous other climate-related extremes, including devastating storms, floods, heatwaves and droughts, causing thousands of casualties and huge economic losses for citizens, companies and states. While it is difficult to attribute single events to climate change, the patterns are well aligned with the findings of the recently released Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C (IPCC, 2018).”
  - “Countries need to strengthen the ambition of NDCs and scale up and increase effectiveness of domestic policy to achieve the temperature goals of the Paris Agreement. To bridge the 2030 emissions gap and ensure long-term decarbonization consistent with the Paris Agreement goals, countries must enhance their mitigation ambition.”

#### **AR5 – 5<sup>th</sup> IPCC Assessment Report (2014)**

- **Key quotes:**
  - “Human influence on the climate system is clear and growing, with impacts observed across all continents and oceans. Many of the observed changes since the 1950s are unprecedented over decades to millennia. The IPCC is now 95 percent certain that humans are the main cause of current global warming.”
  - “From 1992 to 2011, the Greenland and Antarctic ice sheets have been losing mass, and at a larger rate over 2002 to 2011. Glaciers have continued to shrink almost worldwide. From 1979 to 2012, the annual mean Arctic sea-ice decreased by 3.5 to 4.1% per decade. The rate of sea level rise since the mid-19<sup>th</sup> century has been larger than the mean rate during the previous two millennia.”
  - “It is very likely that heat waves will occur more often and last longer, extreme precipitation events will become more intense and frequent, the oceans will continue to warm and acidify, and the global mean sea level will rise.”

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- “Substantial emissions reductions over the next few decades can reduce climate risks and costs and challenges of mitigation in the longer-term. Pathways to limit warming to below 2°C relative to pre-industrial levels require near zero emissions of CO<sub>2</sub> and other long-lived greenhouse gases by the end of the century.”

### **Scientific Reports**

#### **Consensus on consensus: a synthesis of consensus estimates on human-caused global warming (Environmental Research Letters, 2016)**

- **Key Quotes:**
  - “The consensus that humans are causing recent global warming is shared by 90%–100% of publishing climate scientists according to six independent studies by co-authors of this paper. The results of this synthesis are consistent with the 97 percent consensus reported by Cook et al in 2013, and the synthesis concludes that the 97 percent consensus is robust and consistent with other surveys of climate scientists and peer-reviewed studies.”
  - “The number of papers rejecting AGW [Anthropogenic, or human-caused, Global Warming] is a minuscule proportion of the published research, with the percentage slightly decreasing over time. Among papers expressing a position on AGW, an overwhelming percentage (97.2% based on self-ratings, 97.1% based on abstract ratings) endorses the scientific consensus on AGW.”

#### **Food, Water, Energy, and Climate Outlook (MIT, 2016)**

- **Key quotes:**
  - “If nothing beyond the COP21 proposals is implemented, with high climate sensitivity, the 2°C target may be exceeded in as little as 15 to 20 years from now.”
  - “To meet a goal of stabilizing GHG concentrations (at any level) will ultimately require near-zero, and ultimately zero, net emissions. This will require drastic changes in the global energy mix, and to achieve the goal of staying below 2°C or even aiming for 1.5°C, this transformation will need to be well underway within the next 10 to 20 years.”

#### **The Economic Consequences of Climate Change (OECD, 2015)**

- **Key quotes:**
  - “Modeling economic impacts across sectors, the ENV-Linkages model simulations projects that if no further climate action is taken, the combined impacts on GDP are projected to increase over time and rise faster than the rates of economic activity, to likely levels of 1 percent to 3.3 percent by 2060, with a central prediction of 2 percent.”

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- “As temperatures continue to rise to a projected 4 degrees Celsius above pre-industrial levels by 2100, GDP may be hurt between 2 and 10 percent by the end of the century, according to AD-DICE projections.”
- Experimental projections show that “continuing to emit greenhouse emissions as usual until 2060 will commit the world to economic damages in a range of 1 percent to 6 percent by the end of the century even if emissions fall to zero in 2060.”
- “Net economic consequences are projected to be negative in 23 of the 25 regions modelled in the analysis, with especially large impacts in Africa and Asia.”

### **Assessing the Post 2020 Clean Energy Landscape (World Resources Institute, 2015)**

- **Key quotes:**
  - “Increased use of clean energy will be essential to tackling the problem of climate change—not only to reduce greenhouse gas (GHG) emissions, but also to improve energy security, sustain the growth of the global economy, and provide energy access to the billions of people still living without modern energy services”
  - “Assuming that these proposed clean energy plans are achieved, total annual renewable energy supply in Brazil, China, the European Union, and Indonesia will nearly double by 2030.”